

```
In [ ]: import pandas as pd
```

```
In [ ]: df = pd.read_csv("data/TripAdvisor_RestauarantRecommendation.csv")
```

```
In [ ]: df
```

Out[]:

	Name	Street Address	Location	Type	Reviews	No of Reviews	Comments	Contact Number	Trip_
0	Betty Lou's Seafood and Grill	318 Columbus Ave	San Francisco, CA 94133-3908	Seafood, Vegetarian Friendly, Vegan Options	4.5 of 5 bubbles	243 reviews	NaN	+1 415-757-0569	https://www.tripadvisor.com//Restaurai
1	Coach House Diner	55 State Rt 4	Hackensack, NJ 07601-6337	Diner, American, Vegetarian Friendly	4 of 5 bubbles	84 reviews	Both times we were there very late, after 11 P...	+1 201-488-4999	https://www.tripadvisor.com//Restaurai
2	Table Talk Diner	2521 South Rd Ste C	Poughkeepsie, NY 12601-5476	American, Diner, Vegetarian Friendly	4 of 5 bubbles	256 reviews	Waitress was very friendly but a little pricey...	+1 845-849-2839	https://www.tripadvisor.com//Restaurai
3	Sixty Vines	3701 Dallas Pkwy	Plano, TX 75093-7777	American, Wine Bar, Vegetarian Friendly	4.5 of 5 bubbles	235 reviews	Not sure why I went there for the second time....	+1 469-620-8463	https://www.tripadvisor.com//Restaurai
4	The Clam Bar	3914 Brewerton Rd	Syracuse, NY 13212	American, Bar, Seafood	4 of 5 bubbles	285 reviews	Doesn't look like much from the outside but wa...	+1 315-458-1662	https://www.tripadvisor.com//Restaurai
...
3057	Indigo Kitchen & Ale House	2902 164th St SW	Lynnwood, WA 98087-3201	American, Bar, Vegetarian Friendly	4.5 of 5 bubbles	198 reviews	We had to wait a few minutes to get it but it ...	+1 425-741-8770	https://www.tripadvisor.com//Restaurai
3058	City Vineyard	233 West Street	New York City, NY 10013	American, Bar, Seafood	4.5 of 5 bubbles	374 reviews	Came here to see Andrea Gibson perform, we wer...	+1 646-677-8350	https://www.tripadvisor.com//Restaurai
3059	BRIO Tuscan Grille	3710 US Highway 9	Freehold, NJ 07728-4801	Steakhouse, Italian, Bar	4 of 5 bubbles	211 reviews	We come to Brio once a month. They are good fo...	+1 732-683-1045	https://www.tripadvisor.com//Restaurai
3060	Maywood Pancake house	92 W Pleasant Ave	Maywood, NJ 07607-1336	American, Vegan Options, Gluten Free Options	4 of 5 bubbles	87 reviews	Stopped in yesterday for Breakfast. When in Je...	+1 201-880-7842	https://www.tripadvisor.com//Restaurai
3061	Porto Leggero	Harborside Financial Center - Plaza 5	Jersey City, NJ 07311	Italian, Vegetarian Friendly, Vegan Options	4.5 of 5 bubbles	183 reviews	First time for dinner. 2 couples. Delicious mu...	+1 201-434-3200	https://www.tripadvisor.com//Restaurai

3062 rows × 11 columns

```
In [ ]: df.columns
```

```
Out[ ]: Index(['Name', 'Street Address', 'Location', 'Type', 'Reviews',  
            'No of Reviews', 'Comments', 'Contact Number', 'Trip_advisor Url',  
            'Menu', 'Price_Range'],  
          dtype='object')
```

```
In [ ]: ### type column
```

```
In [ ]: df['Type'][800] # type column for generating our meta data ## BOW, ## TFIDF
```

```
Out[ ]: ' Italian, Pizza, Vegetarian Friendly'
```

```
In [ ]: df['Reviews'][0]    ## preprocessing is needed
```

```
Out[ ]: '4.5 of 5 bubbles'
```

```
In [ ]: df['No of Reviews']    ### preprocessing needed
```

```
Out[ ]: 0      243 reviews
        1      84 reviews
        2     256 reviews
        3     235 reviews
        4     285 reviews
        ...
        3057    198 reviews
        3058    374 reviews
        3059    211 reviews
        3060     87 reviews
        3061    183 reviews
        Name: No of Reviews, Length: 3062, dtype: object
```

```
In [ ]: df['Location']    ### based on the location you can generate features
```

```
Out[ ]: 0      San Francisco, CA 94133-3908
        1      Hackensack, NJ 07601-6337
        2      Poughkeepsie, NY 12601-5476
        3      Plano, TX 75093-7777
        4      Syracuse, NY 13212
        ...
        3057    Lynnwood, WA 98087-3201
        3058    New York City, NY 10013
        3059    Freehold, NJ 07728-4801
        3060    Maywood, NJ 07607-1336
        3061    Jersey City, NJ 07311
        Name: Location, Length: 3062, dtype: object
```

```
In [ ]: df['Comments'][1]
```

```
Out[ ]: "Both times we were there very late, after 11 PM. At that time in many diners (forget restaurants!) you get w
armed-over food and lousy service. Not so here - food was uniformly very good and the service quite good. Th
ere weren't many people but it...More"
```

```
In [ ]: df['Comments'][500]    ### Generate the features using TFIDF, BOW
```

```
Out[ ]: 'Top-notch food, best-in-class cocktails, and a really delightful staff! Ashley & Maddie were simply wonderfu
l and the owners are just so welcoming! Definitely a spot to which I'll return!'
```

preprocessing

```
In [ ]: ### any null values present or not
```

```
In [ ]: df.isna().sum()
```

```
Out[ ]: Name      0
        Street Address  0
        Location      0
        Type          13
        Reviews        0
        No of Reviews  0
        Comments      615
        Contact Number  0
        Trip_advisor Url  0
        Menu           0
        Price_Range     0
        dtype: int64
```

```
In [ ]: df['Reviews'].unique()
```

```
Out[ ]: array(['4.5 of 5 bubbles', '4 of 5 bubbles', '5 of 5 bubbles',
              '3.5 of 5 bubbles', '3 of 5 bubbles', 'No review'], dtype=object)
```

```
In [ ]: # df['No of Reviews'].unique()
```

```
In [ ]: df[df['Reviews']=="No review"]
```

Out []:		Name	Street Address	Location	Type	Reviews	No of Reviews	Comments	Contact Number	Trip_advisor Url
	1744	Wavershak's Deli	1800 Route 9	Toms River, NJ 08755-1284	NaN	No review	Undefined Number	No Comments	+1 732-286-3250	https://www.tripadvisor.com//Restaurant_Review.
	2866	Wavershak's Deli	1800 Route 9	Toms River, NJ 08755-1284	NaN	No review	Undefined Number	No Comments	+1 732-286-3250	https://www.tripadvisor.com//Restaurant_Review.

```
In [ ]: df[df['No of Reviews']=="Undefined Number"]
```

Out []:		Name	Street Address	Location	Type	Reviews	No of Reviews	Comments	Contact Number	Trip_advisor Url
	1744	Wavershak's Deli	1800 Route 9	Toms River, NJ 08755-1284	NaN	No review	Undefined Number	No Comments	+1 732-286-3250	https://www.tripadvisor.com//Restaurant_Review.
	2866	Wavershak's Deli	1800 Route 9	Toms River, NJ 08755-1284	NaN	No review	Undefined Number	No Comments	+1 732-286-3250	https://www.tripadvisor.com//Restaurant_Review.

```
In [ ]: df = df.drop([1744,2866])
```

```
In [ ]: df[df['No of Reviews']=="Undefined Number"]
```

Out []:		Name	Street Address	Location	Type	Reviews	No of Reviews	Comments	Contact Number	Trip_advisor Url	Menu	Price_Range
----------	--	------	----------------	----------	------	---------	---------------	----------	----------------	------------------	------	-------------

```
In [ ]: # once dropped your index will change
```

```
In [ ]: df = df.reset_index(drop=True)
```

```
In [ ]:
```

filling the missing values for "comments"

```
In [ ]:
```

```
In [ ]: df['Comments'][0]
```

```
Out [ ]: nan
```

```
In [ ]: df['Comments'] = df['Comments'].fillna("")
```

```
In [ ]:
```

filling of missing data "Type"

```
In [ ]: df['Type'].value_counts().index[0]
```

```
Out [ ]: ' Italian, Vegetarian Friendly, Vegan Options'
```

```
In [ ]: df["Type"] = df['Type'].fillna(df['Type'].value_counts().index[0])
```

```
In [ ]: df.isna().sum()
```

```
Out[ ]: Name          0
        Street Address 0
        Location       0
        Type           0
        Reviews        0
        No of Reviews  0
        Comments       0
        Contact Number 0
        Trip_advisor Url 0
        Menu           0
        Price_Range    0
        dtype: int64
```

exploratory data analysis

10 most common type of restaurants

```
In [ ]: ##### all list of food kind per restaurant
```

```
In [ ]: df.shape
```

```
Out[ ]: (3060, 11)
```

```
In [ ]: df.Type[0].split(",")
```

```
Out[ ]: [' Seafood', ' Vegetarian Friendly', ' Vegan Options']
```

```
In [ ]: types = []
        for i in range(len(df)):
            if type(df.Type[i]) == str:
                types.append(df.Type[i].split(","))
```

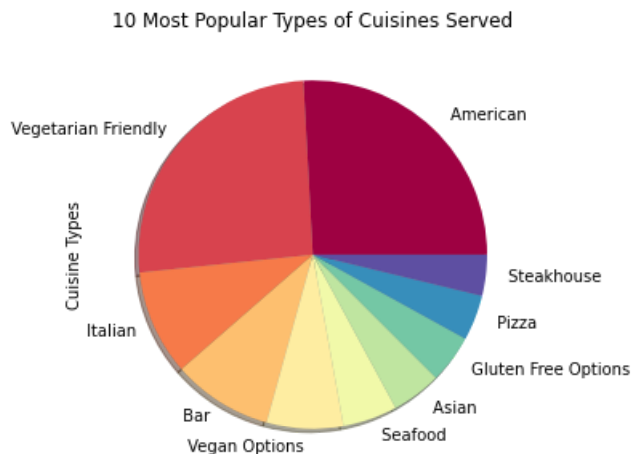
```
In [ ]: import itertools
        flat_list = list(itertools.chain(*types))
        series = pd.Series(flat_list)
```

```
In [ ]: pd.Series(series).value_counts()[0:10]
```

```
Out[ ]: American          1558
        Vegetarian Friendly 1553
        Italian           588
        Bar               561
        Vegan Options     428
        Seafood           305
        Asian             278
        Gluten Free Options 270
        Pizza             254
        Steakhouse        229
        dtype: int64
```

```
In [ ]: import matplotlib.pyplot as plt
```

```
In [ ]: ax = pd.Series(series).value_counts()[0:10].plot(kind='pie', shadow=True, cmap=plt.get_cmap('Spectral'), figsize=(10, 10))
        ax.set_ylabel('Cuisine Types')
        plot = ax.set_title("10 Most Popular Types of Cuisines Served")
```



which state has the most number of restaurants

```
In [ ]: df['Location']
```

```
Out[ ]: 0      San Francisco, CA 94133-3908
        1      Hackensack, NJ 07601-6337
        2      Poughkeepsie, NY 12601-5476
        3      Plano, TX 75093-7777
        4      Syracuse, NY 13212
        ...
        3055     Lynnwood, WA 98087-3201
        3056     New York City, NY 10013
        3057     Freehold, NJ 07728-4801
        3058     Maywood, NJ 07607-1336
        3059     Jersey City, NJ 07311
Name: Location, Length: 3060, dtype: object
```

```
In [ ]: df['Location'][4].split(",")[-1].split(" ")[1]
```

```
Out[ ]: 'NY'
```

```
In [ ]:
```

```
In [ ]: ##### list comprehension
```

```
In [ ]: df["State"] = [i.split(",")[-1].split(" ")[1] for i in df.Location]
```

```
In [ ]: # df['State']
```

```
In [ ]: df['Location'][4].split(",")[-1].split(" ")[-1]
```

```
Out[ ]: '13212'
```

```
In [ ]: df['ZipCode'] = [i.split(",")[-1].split(" ")[-1] for i in df.Location]
df['City'] = [",".join(i.split(",")[:-1]) for i in df.Location]
```

```
In [ ]: # df
```

```
In [ ]: df = df.drop("Location",axis=1)
```

```
In [ ]: df['State'].value_counts()
```

```
Out[ ]: NY      650
        CA      615
        TX      614
        WA      606
        NJ      563
        PA       9
        OR       2
        1
Name: State, dtype: int64
```

rank the best highly rated restaurants from each state

```
In [ ]: df['No of Reviews'] = [int(i.split(" ")[0].replace(",","")) for i in df['No of Reviews']]
```

```
In [ ]: df['No of Reviews']
```

```
Out[ ]: 0      243
        1      84
        2     256
        3     235
        4     285
        ...
        3055    198
        3056    374
        3057    211
        3058     87
        3059    183
Name: No of Reviews, Length: 3060, dtype: int64
```

```
In [ ]: df['Reviews'] = [float(i.split(" ")[0]) for i in df.Reviews]
```

```
In [ ]: df['Reviews']
```

```
Out[ ]: 0      4.5
      1      4.0
      2      4.0
      3      4.5
      4      4.0
      ...
    3055    4.5
    3056    4.5
    3057    4.0
    3058    4.0
    3059    4.5
Name: Reviews, Length: 3060, dtype: float64
```

```
In [ ]: df['weighted_ratings'] = df['Reviews'] * df['No of Reviews']
```

```
In [ ]: df.sort_values(by = "weighted_ratings", ascending = False)[0:10]
```

	Name	Street Address	Type	Reviews	No of Reviews	Comments	Contact Number	Trip_advisor Url
2164	Big Texan Steak Ranch	7701 E Interstate 40	American, Steakhouse, Southwestern	4.0	5448	Roquefort dressing homemade and delicious. I h...	+1 806-372-6000	https://www.tripadvisor.com//Restaurant_Review...
883	Boudro's	421 E Commerce St	American, Southwestern, Vegetarian Friendly	4.5	4620	Had been here roughly 10 years ago on vacation...	+1 210-224-8484	https://www.tripadvisor.com//Restaurant_Review...
2632	The River Cafe	1 Water St	American, Wine Bar, Vegetarian Friendly	4.5	4055	This is one of those iconic restaurants you se...	+1 718-522-5200	https://www.tripadvisor.com//Restaurant_Review...
1884	Club A Steakhouse	240 E 58th Street	American, Steakhouse, Gluten Free Options	4.5	3978	Excellent filet mignon& beautiful ambiance. Th...	+1 212-688-4190	https://www.tripadvisor.com//Restaurant_Review...
2720	Club A Steakhouse	240 E 58th Street	American, Steakhouse, Gluten Free Options	4.5	3978	Excellent filet mignon& beautiful ambiance. Th...	+1 212-688-4190	https://www.tripadvisor.com//Restaurant_Review...
604	Taste of Texas Restaurant	10505 Katy Fwy	American, Steakhouse, Vegetarian Friendly	4.5	3807	Enjoyed a great dinnEnjoyed a great dinner at ...	+1 713-932-6901	https://www.tripadvisor.com//Restaurant_Review...
1989	Trio Restaurant	707 N Palm Canyon Dr	American, Bar, Contemporary	4.5	3785		+1 760-864-8746	https://www.tripadvisor.com//Restaurant_Review...
337	Hollywood Cafe	530 North Point St	American, Cafe, Vegetarian Friendly	4.5	3775		+1 415-563-3779	https://www.tripadvisor.com//Restaurant_Review...
2541	Le Bernardin	155 W 51st St	French, Vegetarian Friendly, Gluten Free Options	4.5	3444	Had the Valentine's tasting menu and the overa...	+1 212-554-1515	https://www.tripadvisor.com//Restaurant_Review...
2570	Daniel	60 East 65th Street	French, Vegetarian Friendly, Vegan Options	4.5	3274	Wonderful restaurant, pleasant. The menu at DA...	212 288 0033	https://www.tripadvisor.com//Restaurant_Review...

best state for good food

```
In [ ]:
```

best city for food

In []:

build a recommendation system

In []: `df2 = df[["Name", "Type"]]`

In []: `df2.index`

Out[]: `RangeIndex(start=0, stop=3060, step=1)`

In []: `indices = pd.Series(df2.index, index = df2['Name'])`

In []: `indices['Sixty Vines']`

Out[]: `3`

In []: `features = df2['Type'].tolist()`

In []: `features[0]`

Out[]: `' Seafood, Vegetarian Friendly, Vegan Options'`

meta data based rec sys based on "type" feature

extract the features using tfidf

In []: `from sklearn.feature_extraction.text import TfidfVectorizer`

In []: `features`

```
Out[ ]: [' Seafood, Vegetarian Friendly, Vegan Options',
        ' Diner, American, Vegetarian Friendly',
        ' American, Diner, Vegetarian Friendly',
        ' American, Wine Bar, Vegetarian Friendly',
        ' American, Bar, Seafood',
        ' Seafood, Italian, Pizza',
        ' American, Steakhouse, Bar',
        ' Mediterranean, Greek, Healthy',
        ' Italian, Pizza, Vegetarian Friendly',
        ' American, Steakhouse, Gluten Free Options',
        ' Italian, Vegetarian Friendly, Gluten Free Options',
        ' Cafe, American, Vegetarian Friendly',
        ' Irish, Bar, Pub',
        ' American, Bar, Vegetarian Friendly',
        ' American, Cafe, Healthy',
        ' American, Bar, Pub',
        ' Steakhouse, Latin, Argentinean',
        ' Chinese, Asian, Taiwanese',
        ' Belgian, French, Cafe',
        ' American, Cajun & Creole, Vegetarian Friendly',
        ' Steakhouse, Mexican, Vegetarian Friendly',
        ' American, Vegetarian Friendly, Vegan Options',
        ' Bar, Contemporary, Fusion',
        ' American, Bar, Gluten Free Options',
        ' American, European, Vegetarian Friendly',
        ' Italian, Vegetarian Friendly, Gluten Free Options',
        ' American, Bar, Contemporary',
        ' Latin, Spanish, Vegetarian Friendly',
        ' American, Bar, Gastropub',
        ' Italian, Vegetarian Friendly, Gluten Free Options',
        ' Spanish, Mediterranean, Wine Bar',
        ' Chinese, Asian, Vegetarian Friendly',
        ' American, Vegetarian Friendly, Vegan Options',
        ' American, Vegetarian Friendly',
        ' Mexican, Southwestern, Vegetarian Friendly',
        ' Mediterranean, Greek, Italian',
        ' Cajun & Creole, American, Vegetarian Friendly',
        ' Italian, Vegetarian Friendly, Vegan Options',
        ' American, Bar, Pub',
        ' American, Seafood',
        ' American, Steakhouse, Gluten Free Options',
        ' American, Vegetarian Friendly, Vegan Options',
        ' Italian, Pizza, Vegetarian Friendly',
        ' Pizza, Vegetarian Friendly, Vegan Options',
        ' Italian, Pizza, Deli',
        ' Caribbean, Latin, Spanish',
        ' American, Bar, Pub',
        ' Mexican',
        ' French, European, Vegetarian Friendly',
        ' Italian, Vegetarian Friendly, Vegan Options',
        ' American, Cafe, Diner',
        ' American, Southwestern, Vegetarian Friendly',
        ' Indian, Asian, Vegetarian Friendly',
        ' Cafe',
        ' American, Cafe, International',
        ' American, Bar, International',
        ' American, Seafood, Vegetarian Friendly',
        ' American, Bar, Seafood',
        ' American, Seafood, Vegetarian Friendly',
        ' Asian, Thai, Vegetarian Friendly',
        ' American, Bar, Pub',
        ' Greek, Italian, Pizza',
        ' American, Seafood, Bar',
        ' American, Seafood, Gluten Free Options',
        ' American, Diner',
        ' American, Steakhouse, Vegetarian Friendly',
        ' American, Bar, Seafood',
        ' American, Vegetarian Friendly, Vegan Options',
        ' American, Steakhouse, Gluten Free Options',
        ' American, Vegetarian Friendly, Vegan Options',
        ' Japanese, Sushi, Asian',
        ' Asian, Thai, Vegetarian Friendly',
        ' American, Cafe, Vegetarian Friendly',
        ' Thai, Asian, Vegan Options',
        ' American, Vegetarian Friendly, Vegan Options',
        ' Italian, American, Pizza',
        ' American, Southwestern, Bar',
        ' American, Vegetarian Friendly, Vegan Options',
        ' Italian, American, Seafood',
        ' Pizza, Vegetarian Friendly',
        ' Asian, Indian, Tibetan',
        ' American, Steakhouse, Southwestern',
```


Indian, Vegetarian Friendly, Vegan Options',
' American, Steakhouse, Bar',
' American, Contemporary, Vegetarian Friendly',
' American, Wine Bar, Vegetarian Friendly',
' Latin, Cuban, Caribbean',
' Italian, Pizza, Vegetarian Friendly',
' Italian, Vegetarian Friendly',
' American, Vegetarian Friendly, Gluten Free Options',
' American, Seafood, Gluten Free Options',
' Indonesian, American, Vegetarian Friendly',
' American, Steakhouse, Gluten Free Options',
' Italian, Pizza, Vegetarian Friendly',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Bar',
' Pizza, Italian',
' Italian, Pizza, Fast Food',
' Latin, Barbecue, Brazilian',
' American, Deli, Vegetarian Friendly',
' American, Bar, Pub',
' American, Bar, Pub',
' Mexican, Latin, Vegetarian Friendly',
' American, Sushi, Gluten Free Options',
' Chinese, Vegan Options',
' American, Barbecue, Gluten Free Options',
' Deli, Vegetarian Friendly',
' American, Bar, Vegetarian Friendly',
' Japanese, Sushi, Asian',
' Japanese, Sushi, Asian',
' American, Steakhouse',
' Italian, Pizza, Vegan Options',
' Japanese, Sushi, Asian',
' Mexican, Latin, Spanish',
' Italian, Vegan Options, Vegetarian Friendly',
' American, Cafe, Vegetarian Friendly',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Vegetarian Friendly, Vegan Options',
' Mexican, Latin',
' Italian, Pizza, Vegetarian Friendly',
' American, Seafood',
' Asian, Vietnamese, Vegetarian Friendly',
' American, Bar, Seafood',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Contemporary, Vegetarian Friendly',
' Mexican, Latin, Bar',
' French, International, European',
' Mediterranean, Middle Eastern, Vegan Options',
' Italian, Vegetarian Friendly',
' American, Bar, Cafe',
' Italian, Pizza, Vegetarian Friendly',
' Chinese, Asian, Vegetarian Friendly',
' Seafood, European, Spanish',
' Italian, Pizza, Vegetarian Friendly',
' Mexican, Vegetarian Friendly',
' Italian, Pizza, Vegetarian Friendly',
' Italian, Pizza, Wine Bar',
' American, Seafood, Vegetarian Friendly',
' American, Diner, Vegetarian Friendly',
' Italian, Mediterranean, Sicilian',
' American, International, Vegetarian Friendly',
' American, Greek, Diner',
' American, Bar, Pub',
' German, European, Vegetarian Friendly',
' American, Steakhouse, Gluten Free Options',
' Mediterranean, Greek, Vegetarian Friendly',
' Italian, Vegetarian Friendly, Gluten Free Options',
' American, Seafood',
' Italian, Pizza, Vegetarian Friendly',
' French, Gluten Free Options, Vegetarian Friendly',
' Seafood',
' French, Vegetarian Friendly, Vegan Options',
' Italian, Pizza, Vegetarian Friendly',
' American, Seafood, Vegetarian Friendly',
' American, Bar, Gluten Free Options',
' American, Seafood, Soups',
' Mexican, Southwestern, Vegetarian Friendly',
' Japanese, Sushi, Asian',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Diner',
' Pub, Brew Pub',
' Mexican, Latin, Vegetarian Friendly',
' American, Bar, Pub',
' Japanese, Barbecue, Sushi',

French, Gluten Free Options, Vegetarian Friendly',
' American, Steakhouse',
' American, Deli, Vegetarian Friendly',
' Irish, Bar, Pub',
' Chinese, Asian, Seafood',
' American, Bar, Pub',
' American, Steakhouse',
' American, Steakhouse, Vegetarian Friendly',
' Irish, Bar, Pub',
' American, Bar, Vegetarian Friendly',
' Mediterranean, Greek, Vegetarian Friendly',
' Steakhouse, American, Seafood',
' American, Bar, Pub',
' Mexican, Latin, Central American',
' American, Bar, Pizza',
' American, Diner, Deli',
' American, Vegetarian Friendly, Vegan Options',
' Vegetarian Friendly, Vegan Options, Gluten Free Options',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Steakhouse',
' Asian, Thai, Sushi',
' American, Cafe, Vegetarian Friendly',
' American, Bar, Pub',
' Gastropub, American, Bar',
' American, Bar, Pub',
' American, Bar, Seafood',
' Italian, American, Bar',
' Seafood, Vegetarian Friendly, Vegan Options',
' Italian, Pizza, Fast Food',
' American, Cafe, Vegetarian Friendly',
' American, Asian, Fast Food',
' American, Seafood, Cajun & Creole',
' American, Diner, Vegetarian Friendly',
' American, Bar, Pub',
' American, Vegetarian Friendly, Vegan Options',
' Seafood, Gluten Free Options',
' Italian, Pizza, Gluten Free Options',
' Asian, Thai, Vegetarian Friendly',
' Indian, Pakistani, Vegetarian Friendly',
' American, Steakhouse, Gluten Free Options',
' Seafood, European, Spanish',
' Chinese, Sushi, Asian',
' American, Steakhouse',
' American, Bar, Diner',
' Japanese, Sushi, Asian',
' Mediterranean, Vegetarian Friendly, Vegan Options',
' American, Vegetarian Friendly, Gluten Free Options',
' American, Steakhouse, Bar',
' American, Bar, Vegetarian Friendly',
' Italian, Vegetarian Friendly, Vegan Options',
' Bar, American, Pub',
' Barbecue',
' American, Deli, Vegetarian Friendly',
' American, Bar, Vegetarian Friendly',
' Irish, Bar, Pub',
' Barbecue, American, Southwestern',
' American, Italian, Vegetarian Friendly',
' American, Fast Food, Diner',
' Chinese, Asian, Vegetarian Friendly',
' Italian, European, Sicilian',
' Italian, Spanish, Vegetarian Friendly',
' American, International, Vegetarian Friendly',
' European, Vegetarian Friendly, Gluten Free Options',
' American, Vegetarian Friendly, Vegan Options',
' Mexican, Southwestern, Latin',
' American, Diner, Gluten Free Options',
' Asian, Thai, Vegetarian Friendly',
' Steakhouse, Latin, Argentinean',
' American, Bar, Vegetarian Friendly',
' Mexican, American, Southwestern',
' Italian, Pizza, Neapolitan',
' Mexican, Southwestern, Vegetarian Friendly',
' American, Gluten Free Options, Vegetarian Friendly',
' Irish, Pub',
' American, Bar, Pub',
' American, Steakhouse, Bar',
' Mexican, Southwestern, Bar',
' Italian, Pizza, Vegetarian Friendly',
' Italian, Pizza, Vegetarian Friendly',
' Italian, Pizza, Vegetarian Friendly',
' Vegetarian Friendly, Gluten Free Options',
' Italian, Pizza, Vegetarian Friendly',

' Seafood',
' American, Seafood, Bar',
' American, Gastropub, Pub',
' American, Bar, Cafe',
' American, Bar, Pub',
' American, Bar, Vegetarian Friendly',
' American, Cafe, Gluten Free Options',
' American, Vegan Options, Vegetarian Friendly',
' Caribbean, Latin, Spanish',
' Mexican, Latin, Vegetarian Friendly',
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' Asian, Thai, Vegetarian Friendly',
' American, Cafe, Vegetarian Friendly',
' American, Cafe, Vegetarian Friendly',
' American, Seafood, Gluten Free Options',
' Indian, Vegetarian Friendly, Vegan Options',
' Mexican, Fast Food, Vegetarian Friendly',
' American, Contemporary, Vegetarian Friendly',
' American, Cafe, Diner',
' Italian, American, Wine Bar',
' Japanese, Sushi, Asian',
' Italian, Pizza, Vegetarian Friendly',
' American, Diner, Vegetarian Friendly',

```
' Sushi, Asian, Japanese',
' American, Sushi, Vegetarian Friendly',
' American, Bar, Pub',
' Chinese, Asian, Vegetarian Friendly',
' Italian, Vegetarian Friendly, Vegan Options',
' American, Bar, Pub',
' Mexican, Latin, Vegetarian Friendly',
' American, Seafood, International',
' American, Steakhouse, Vegetarian Friendly',
' Italian, Mediterranean, European',
' American, Bar, Pizza',
' Lebanese, Mediterranean, Greek',
' Chinese, Asian, Vegetarian Friendly',
' Italian, Pizza, Vegetarian Friendly',
' American, Contemporary, Vegetarian Friendly',
' American, Vegetarian Friendly, Vegan Options',
...]
```

```
In [ ]: tfidf = TfidfVectorizer(stop_words= "english")
```

```
In [ ]: tfidf_matrix = tfidf.fit_transform(features)
```

```
In [ ]: tfidf_matrix.shape
```

```
Out[ ]: (3060, 112)
```

```
In [ ]: #### cosine similarity
```

```
In [ ]: from sklearn.metrics.pairwise import cosine_similarity
```

```
In [ ]: similarity = cosine_similarity(tfidf_matrix, tfidf_matrix)
```

```
In [ ]: similarity.shape
```

```
Out[ ]: (3060, 3060)
```

```
In [ ]: similarity[4]
```

```
Out[ ]: array([0.42755296, 0.11907431, 0.11907431, ..., 0.29562158, 0.07881715,
0.          ])
```

the function we write might be same

```
In [ ]: indices['The Clam Bar']
```

```
Out[ ]: 4
```

```
In [ ]: similarity[4]
```

```
Out[ ]: array([0.42755296, 0.11907431, 0.11907431, ..., 0.29562158, 0.07881715,
0.          ])
```

```
In [ ]: similarity[57]
```

```
Out[ ]: array([0.42755296, 0.11907431, 0.11907431, ..., 0.29562158, 0.07881715,
0.          ])
```

```
In [ ]: pd.DataFrame(similarity).head(20)
```

Out []:	0	1	2	3	4	5	6	7	8	9	...	3050	3051	
0	1.000000	0.195748	0.195748	0.152300	0.427553	0.354220	0.000000	0.000000	0.201356	0.164347	...	0.345883	0.000000	C
1	0.195748	1.000000	1.000000	0.249195	0.119074	0.000000	0.113775	0.000000	0.220814	0.080360	...	0.565938	0.000000	C
2	0.195748	1.000000	1.000000	0.249195	0.119074	0.000000	0.113775	0.000000	0.220814	0.080360	...	0.565938	0.000000	C
3	0.152300	0.249195	0.249195	1.000000	0.325339	0.000000	0.310859	0.000000	0.171802	0.062524	...	0.440321	0.000000	C
4	0.427553	0.119074	0.119074	0.325339	1.000000	0.437926	0.450431	0.000000	0.000000	0.090596	...	0.210402	0.000000	C
5	0.354220	0.000000	0.000000	0.000000	0.437926	1.000000	0.000000	0.000000	0.701752	0.000000	...	0.000000	0.000000	C
6	0.000000	0.113775	0.113775	0.310859	0.450431	0.000000	1.000000	0.000000	0.000000	0.488892	...	0.201037	0.000000	C
7	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	...	0.000000	0.000000	C
8	0.201356	0.220814	0.220814	0.171802	0.000000	0.701752	0.000000	0.000000	1.000000	0.000000	...	0.390173	0.000000	C
9	0.164347	0.080360	0.080360	0.062524	0.090596	0.000000	0.488892	0.000000	0.000000	1.000000	...	0.141995	0.000000	C
10	0.324211	0.169023	0.169023	0.131506	0.000000	0.196601	0.000000	0.000000	0.390388	0.677534	...	0.298659	0.000000	C
11	0.203732	0.333349	0.333349	0.259359	0.123931	0.000000	0.118415	0.000000	0.229820	0.083638	...	0.589021	0.000000	C
12	0.000000	0.000000	0.000000	0.138828	0.201160	0.000000	0.192207	0.000000	0.000000	0.000000	...	0.000000	0.000000	C
13	0.255803	0.418549	0.418549	0.595378	0.546442	0.000000	0.522121	0.000000	0.288559	0.105015	...	0.739567	0.000000	C
14	0.000000	0.072563	0.072563	0.056457	0.081805	0.000000	0.078164	0.577252	0.000000	0.055208	...	0.128217	0.000000	C
15	0.000000	0.109551	0.109551	0.299318	0.433708	0.000000	0.414405	0.000000	0.000000	0.083350	...	0.193574	0.000000	C
16	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.310369	0.000000	0.000000	0.219217	...	0.000000	0.275633	C
17	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000	C
18	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	...	0.000000	0.000000	C
19	0.115802	0.189476	0.189476	0.147420	0.070443	0.000000	0.067307	0.000000	0.130630	0.047540	...	0.334801	0.000000	C

20 rows × 3060 columns

```

In [ ]: def restaurant_rec_sys(name, similarity = similarity):
        index = indices[name]
        similarity_scores = list(enumerate(similarity[index]))
        similarity_scores = sorted(similarity_scores, key = lambda x: x[1],reverse = True)
        similarity_scores = similarity_scores[:11]
        res_indices = [i[0] for i in similarity_scores]
        return df2['Name'].iloc[res_indices]

```

```

In [ ]: restaurant_rec_sys("The Clam Bar")

```

```

Out[ ]: 4          The Clam Bar
57      Buzzard Billy's
62      Cedars at Pier One
66  Maxie's Supper Club and Oyster Bar
122      Duke's Huntington Beach
189      River Station Restaurant
247      Fish City Grill
304      Tony's On the Pier
374      Pacific Grill
393      Anthony's Woodfire Grill
436      The Crow's Nest
Name: Name, dtype: object

```

```

In [ ]: restaurant_rec_sys("Betty Lou's Seafood and Grill")

```

```

Out[ ]: 0      Betty Lou's Seafood and Grill
191      Six Seven Restaurant
486      Masraff's
779      Blue Clove
2256     Babin's Seafood House
548      Crafted
2825     Roberts Scratch Kitchen
21      Breadsticks Cafe & Grill
32      Hodel's Country Dining
41      The Cheesecake Factory
67      The Cheesecake Factory
Name: Name, dtype: object

```

```

In [ ]: ### the person entered into the website/ mobile app " The Clam Bar"

```

```
In [ ]: index = indices["The Clam Bar"]  
        similarity_scores = list(enumerate(similarity[index]))
```

```
In [ ]: similarity_scores
```

```
Out[ ]: [(0, 0.4275529560664109),
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